Computerized Bioventing Design Tool ™ (BVDT)
A method for the application of bioventing

A Research Effort of the United States Air Force Research Laboratory, AFRL/MLQ

BIOVENTING:

Bioventing is the process of aerating soils to stimulate in situ biological activity and promote bioremediation. It is typically applied in situ to the vadose zone and is applicable to any chemical that can be aerobically biodegraded. However, to date bioventing has been implemented primarily at petroleum-contaminated sites.

Through the efforts of the U.S. Air Force Bioventing Initiative and the U.S. Environmental Protection Agency Bioremediation Field Initiative, bioventing has been implemented at more than 150 sites and has emerged as one of the most cost-effective and efficient technologies currently available for vadose zone remediation of petroleum-contaminated sites. As part of the afore-mentioned effort, Battelle Memorial Institute prepared the Principles and Practices of Bioventing Manual (two volumes) for guidance in bioventing activities.

THE APPROACH:

During the preparation of the Principles and Practices of Bioventing Manual, an internally sponsored research and development project was started at Battelle to build a Computerized Bioventing Design Tool™ (BVDT) to accompany the document. A Microsoft Excel© spreadsheet program was selected to build the BVDT™. The capability of Microsoft Excel Visual Basic© was the primary reason of this choice. With the many existing features and functions of Microsoft Excel©, Battelle was able to construct tables and charts to record field data and conduct data analyses for bioventing. Considering users who may have minimal experience with the Microsoft Excel© program, Battelle built many macros, buttons, menus, charts, and functions to make the BVDT™ easier to use.

THE TOOL:

The latest version of BVDT™ (Version 1.0) is the first public release. It contains BVDT™, the Bioventing Database, a BVDT™ Help File, and a Users Guide in Acrobat portable document format (PDF).

The Users Guide covers basic techniques and special instructions on using Microsoft Excel© and BVDT™ programs.

The BVDT Assists the Users in All Areas of Bioventing:

- Introduction (Chap 1)
- Overview of the BVDT Program (Chap 2)
- Site Information and Project Notes (Chap 3)
- Soil Gas Analysis (Chap 4)
- Respiration Test (Chap 5)
- Permeability & Radius of Influence (Chap 6)
- Blower Design (Chap 7)
- Well Spacing (Chap 8)
- Well Information (Chap 9)
- Database (Chap 10)
- Unit Conversion (Chap 11)

Chapters 3 to 9 correspond to primary data collection, and analysis and system design and operation in the bioventing process. Within these chapters, the background information of the section is presented first and then detailed tutorial instructions and tips follow. Chapter 10 presents three databases related with bioventing activities collected by Battelle in recent years.

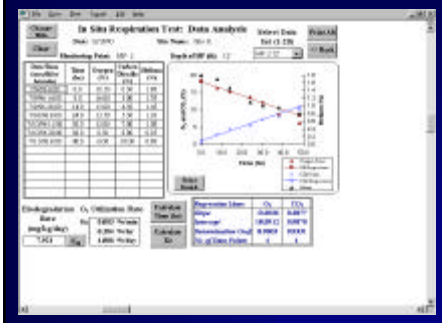
Three Valuable Databases Are Available to the BVDT™ User:

Bioventing Case Study Database

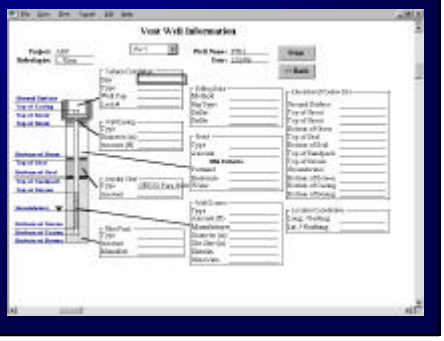
Bioventing Equipment Database

Bioventing Cost Estimator

Sample BVDT™ User Screens



In Situ Respiration Test: Data Analysis



Vent Well Information

COMMERCIALIZATION:

Copies of the BVDT™ can be obtained by contacting those listed below. The latest version is now available. Technical assistance can be obtained by contacting Andrea Leeson at Leeson@Battelle.org. The Principles and Practices of Bioventing Manual (two volumes) which the BVDT™ follows can be downloaded from the internet at http://www.epa.gov/ORD/WebPubs/biorem.

POINTS OF CONTACT:

Maj Tim Wiley Ph: (850) 283-6299
US Air Force Research Laboratory, Fax: (850) 283-6064
Materials and Manufacturing Directorate,
Airbase and Environmental Technology
Division (US AFRL/MLQ)
tim.wiley@mlq.afrl.af.mil

Andrea Leeson Ph: (614) 424-5942
Battelle Memorial Institute Fax: (614) 424-3667
Leeson@Battelle.org